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Effectiveness of a Monitored and Individualized Physiotherapy Program on Gait Recovery in Post-Stroke Patients: A Comparative Experimental Study

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Abstract

Gait impairment is one of the most common and disabling consequences of stroke, significantly affecting functional independence and quality of life. Optimizing rehabilitation strategies remains a key objective in neurorehabilitation. This study aimed to evaluate the effectiveness of a monitored and individualized physiotherapy program compared to a conventional rehabilitation protocol in improving gait performance in post-stroke patients. A randomized controlled study was conducted on 48 post-stroke patients aged 40–50 years, allocated into a control group (n = 24) and an experimental group (n = 24). Both groups underwent a 9 weeks rehabilitation program. The experimental group received a monitored, individualized physiotherapy intervention, while the control group followed a conventional protocol. Gait performance was assessed pre- and post-intervention using the Dynamic Gait Index (DGI) and Lower Extremity Functional Scale (LEFS). Both groups showed significant improvements over time ($p < .001$). However, the experimental group demonstrated greater improvements in walking speed, dynamic balance, and lower limb functional capacity ($p < .05$). The interaction effect between time and group was statistically significant, indicating superior outcomes associated with the monitored intervention. The findings suggest that a monitored and individualized physiotherapy program may be more effective than conventional rehabilitation in improving gait parameters in post-stroke patients. Further studies with larger samples are needed to confirm these results.

Keywords: *stroke rehabilitation, gait recovery, physiotherapy, randomized controlled study*

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1. Introduction

Gait impairment is one of the most frequent and disabling consequences of stroke, significantly reducing patients' functional independence and quality of life.

Stroke results in neurological dysfunction that leads to hemiplegia, representing one of the most severe motor impairments, commonly characterized by deficits in voluntary motor control. Among these, impaired ankle dorsiflexion is particularly significant, as it disrupts normal gait biomechanics and compromises functional ambulation.

Hemiplegia is frequently associated with hypertonia and spasticity of the flexor muscle groups. The upper limb is typically positioned in shoulder abduction with forearm pronation and flexion of the wrist and fingers. Similarly, the lower limb on the affected side demonstrates abnormal motor patterns, with reduced knee extension during the stance phase of gait and a persistent plantarflexed foot posture, contributing to compensatory and inefficient gait patterns.

As a result of post-stroke neuromotor impairment, gait velocity is markedly reduced, accompanied by increased spatial-temporal asymmetry and an enlarged, unstable base of support. Locomotion is frequently characterized by circumduction of the paretic lower limb, reflecting compensatory movement strategies secondary to impaired ankle dorsiflexion and reduced distal motor control (Pirker, 2017). Post stroke gait typically exhibits disrupted intersegmental coordination, abnormal muscle activation timing, and reliance on compensatory kinematic adjustments involving the non affected limb and trunk to maintain functional ambulation (Lofrumento et al., 2021). A hallmark of hemiplegic gait is the absence of physiological heel strike during initial contact on the affected side. Instead, weight acceptance is achieved through excessive hip flexion and altered swing-to-stance transition mechanics, reflecting impaired central motor planning and defective neuromuscular synergy organization during the gait cycle (Simonsen, 2014).

Restoration of gait function represents a central objective of neurorehabilitation, where structured physiotherapy interventions play a pivotal role in promoting locomotor recovery. Targeted therapeutic exercise programs are designed to optimize neuromuscular performance by enhancing muscle strength, improving postural stability, and restoring temporal spatial coordination of the gait cycle.

Contemporary evidence supports the clinical utility of spatiotemporal gait parameters as reliable quantitative biomarkers of functional recovery. Parameters such as gait velocity, step length, and step symmetry provide objective insights into motor performance and rehabilitation progress. The systematic integration of these measures into individualized rehabilitation protocols facilitates precision-based therapeutic modulation and improves functional recovery outcomes.

Therefore, this article aims to present contemporary kinesiological strategies to improve gait in individuals with disabling conditions, emphasizing physiotherapy interventions and gait parameter monitoring as tools to optimize rehabilitation.

This approach integrates theoretical and practical aspects of physiotherapy with modern objective assessment technologies, supporting the development of effective, individualized post-stroke rehabilitation protocols.

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2. Materials and Methods

Recovery of gait function is a priority objective of post-stroke rehabilitation programs, since gait independence significantly influences patient autonomy, social reintegration, and quality of life. We aim to evaluate the impact of a complex rehabilitation program, structured and adapted to each patient's individual characteristics, on walking speed, dynamic balance, and lower limb functional level.

It was hypothesized that a monitored and individualized physiotherapy program would lead to greater improvements in gait-related functional outcomes compared to conventional rehabilitation in post-stroke patients.

Experimental Design

The present study is motivated by the need to optimize physiotherapy interventions for gait rehabilitation following stroke, considering the high prevalence of locomotor disabilities and their major impact on functional independence. Since conventional rehabilitation programs demonstrate variable effectiveness, a comparative evaluation of a monitored protocol is required, as it may allow superior individualization and progressive adaptation of therapy.

By employing a standardized assessment battery and an experimental design with a control group, the study aims to objectively determine the differences between the applied interventions and to support the development of optimized therapeutic strategies.

The main objective of this study is to evaluate the effectiveness of a monitored physiotherapy program for gait rehabilitation in post-stroke patients. The research aims to compare the outcomes obtained after applying the experimental program with those recorded under a conventional rehabilitation protocol, using a standardized battery of two functional tests.

The present study was designed as a randomized controlled experimental study with two parallel groups, aiming to evaluate the effectiveness of a monitored physiotherapy program compared to a conventional rehabilitation protocol in post-stroke patients.

Participants were randomly allocated into either the control group or the experimental group using a simple randomization procedure (computer-generated random numbers). Allocation was performed by an independent researcher not involved in the intervention process. Due to the nature of the intervention, blinding of participants and therapists was not feasible. However, outcome assessment was conducted by an independent evaluator, blinded to group allocation.

Participants

The study comprised a total of 48 patients diagnosed with stroke within the previous six months, aged between 40 and 50 years. Participants were allocated into two groups: a control group (n = 24) and an experimental group (n = 24). The age range was deliberately restricted to minimize variability and to focus on younger stroke survivors, a population characterized by a rising incidence and a considerable potential for functional recovery. Ethical considerations were strictly observed throughout the study. All participants were informed about the purpose and procedures of the research and provided written informed consent prior to their inclusion in the study.

Eligibility was established based on the following criteria: a confirmed diagnosis of stroke, inclusion in the post-acute phase, age between 40 and 50 years, the ability to ambulate with or without assistive devices, the presence of gait impairments, and clinically evident foot drop.

The selection of the 40–50 year age interval was intentional, aiming to ensure cohort homogeneity with respect to neuroplastic potential, functional recovery capacity, and neuromuscular responsiveness to rehabilitation interventions. Individuals within this age range are less likely to present confounding factors such as advanced degenerative changes, multimorbidity, or age-related sarcopenia, which could independently influence gait patterns and rehabilitation outcomes.

At the same time, this group frequently exhibits persistent post-stroke locomotor deficits, including dorsiflexor weakness associated with foot drop, making it particularly relevant for targeted gait rehabilitation strategies.

Although participants did not exhibit severe balance impairments, they demonstrated measurable functional gait deficits identifiable through dynamic assessment instruments such as the Dynamic Gait Index. Gait performance was evaluated pre- and post-intervention using the Dynamic Gait Index (DGI) and the Lower Extremity Functional Scale (LEFS), allowing for a comprehensive assessment of both dynamic balance during ambulation and lower limb functional capacity.

Intervention

The study was based on the hypothesis that the monitored intervention would generate significantly superior improvements in gait parameters compared to the conventional therapeutic approach. The research adopted a parallel-group experimental design, with two study arms (control and experimental), each comprising 24 subjects, enabling a comparative analysis of functional progression and supporting the validation of the effectiveness of the proposed rehabilitation protocol. The intervention was conducted over a period of 9 weeks, with a frequency of three sessions per week. Each session lasted approximately 45–60 minutes and was administered by licensed physiotherapists with experience in neurorehabilitation.

The experimental group followed a monitored and individualized physiotherapy program based on neurorehabilitation principles, including task-oriented training, progressive loading, movement repetition, and proprioceptive and balance training. Exercise intensity and complexity were progressively adjusted based on individual patient performance and tolerance.

The rehabilitation protocol included proximal stability exercises, gait phase training, ankle mobility and dorsiflexion facilitation, and coordination tasks. An ankle–foot orthosis (AFO) was used consistently during the intervention period. The control group followed a conventional rehabilitation program consisting of general mobility exercises, muscle strengthening, and standard gait training, without individualized progression or systematic monitoring.

Presentation of the Test Battery

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To assess gait parameters, a structured battery of two standardized tests was employed to evaluate the functional capacity of the paretic lower limb, the ability to adapt gait to varying environmental demands, and the extent to which participants could approximate a physiological gait pattern.

Functional gait assessment was conducted at baseline (pre-intervention) and repeated at the end of the rehabilitation period (post-intervention), ensuring consistency through the use of a standardized evaluation protocol.

To objectively determine the effectiveness of the intervention on gait performance, two validated and reliable clinical instruments were utilized. These measures are widely recognized for their applicability in neurological populations and provide complementary insights into dynamic balance, gait adaptability, and lower limb functional performance.

1. The Dynamic Gait Index (DGI) is an assessment tool designed to evaluate the ability to adapt gait to varying environmental and functional demands, such as changes in direction, obstacle negotiation, and speed modulation, making it particularly useful for assessing fall risk. The test consists of 8 items with different task requirements. The evaluated abilities include steady-state walking, walking at variable speeds, walking while performing head movements in different directions, walking over and around obstacles, turning during gait, and stair climbing (Herman et al., 2009; Shumway-Cook et al., 2013);

2. The Lower Extremity Functional Scale (LEFS) is a functional self-report questionnaire used to assess patient autonomy and perceived lower limb functional capacity during activities of daily living. The LEFS consists of 20 items evaluating the individual's ability to perform fundamental functional tasks, including walking, stair climbing, and transferring from sitting to standing positions. Research evidence has demonstrated that the LEFS is a reliable and valid clinical tool for assessing the impact of various pathological conditions on lower limb function (Mehta et al., 2016).

The selection of this test battery enables a comprehensive assessment of gait performance by integrating both objective parameters (such as walking speed and dynamic balance) and the functional as well as subjective dimensions of recovery. Based on the initial evaluation and the identified functional characteristics of the patients, a therapeutic intervention program was designed and implemented, aiming to optimize gait parameters with an emphasis on progressive loading, individualized adaptation, and systematic monitoring of functional improvement throughout the rehabilitation process.

Rehabilitation intervention proposal

The intervention was implemented over a nine-week period, with participants engaging in three sessions per week. Each session lasted approximately 45 to 60 minutes and was delivered by licensed physiotherapists specialized in neurorehabilitation. The structured frequency and duration of the sessions were designed to ensure consistent therapeutic exposure while allowing adequate recovery time between sessions. Furthermore, the involvement of experienced clinicians ensured the standardized application of intervention protocols, as well as the adaptation of exercises to

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individual patient needs and functional capacities, thereby optimizing the overall effectiveness of the rehabilitation process.

A key component of the rehabilitation program was the integration of an ankle–foot orthosis (AFO) as an assistive device to enhance gait mechanics. The orthosis was consistently utilized throughout the intervention period to augment proprioceptive input, reinforce kinesthetic memory, and support motor relearning processes associated with post-stroke gait recovery.

The structure of the intervention was individualized based on the initial assessment, taking into account the severity of motor deficit, degree of spasticity, level of postural control, and baseline functional performance. The therapeutic program aimed to restore the physiological motor pattern of gait through interventions targeting both proximal control (postural control and trunk stability) and distal control (selective control of the affected lower limb).

The neuromotor facilitation component incorporated principles of the Bobath concept, with an emphasis on postural tone normalization, inhibition of pathological motor patterns, and facilitation of balance reactions, as well as Proprioceptive Neuromuscular Facilitation (PNF) techniques, used to promote selective recruitment of motor units and improve intersegmental coordination.

Proximal stability training included exercises targeting activation of the abdominal and paravertebral musculature, controlled trunk rotation movements, and postural alignment exercises in standing position, with the aim of optimizing center of gravity control and facilitating efficient load transfer during gait. Gait re-education was structured according to the analysis of the gait cycle phases. During the stance phase, the focus was on improving hip extension, ensuring pelvic stabilization in the frontal plane, and enhancing knee joint control. During the swing phase, interventions were directed toward facilitating knee flexion and ankle dorsiflexion in order to minimize circumduction and other compensatory movement strategies. The intervention also incorporated specific exercises to improve ankle joint mobility and distal neuromuscular control.

Balance and coordination training was performed through proprioceptive exercises, controlled weight-shifting activities, variations in gait speed and direction and gait adaptation to changing environmental conditions, in accordance with the principles of progressive functional training. Intervention monitoring was conducted through periodic functional assessments, qualitative observation of gait parameters (including symmetry, step length, and postural stability), and progressive adjustment of task complexity and exercise intensity. This approach allowed continuous adaptation of the therapeutic program to individual patient responses, thereby optimizing functional recovery outcomes.

Through its structured, progressive, and individualized design, the proposed intervention aimed to improve the temporospatial parameters of gait, enhance neuromuscular control, and increase the level of functional independence in post-stroke patients. The combination of different kinetic strategies was intended to optimize gait biomechanics and increase the effectiveness of physiotherapy intervention. Continuous monitoring of patient progress allowed for the permanent adjustment of the rehabilitation program in order to maximize functional outcomes. In this context, the therapeutic intervention was oriented toward facilitating motor recovery, improving postural control, and increasing independence in activities of daily living, thereby contributing to the improvement of patients' quality of life. Furthermore, the therapeutic approach aimed to stimulate neuroplasticity and reinforce correct movement patterns through repetitive, task-specific training.

The proposed rehabilitation program is structured in progressive stages and incorporates a combination of passive, active-assisted, and active exercises, targeting both joint mobility and the re-education of neuromuscular control and gait patterns. The initial stage is predominantly analytical, focusing on stretching the musculotendinous structures that limit hip mobility and on improving the range of motion at the hip and knee joints. Subsequently, the program integrates exercises aimed at facilitating muscle activation and selectively strengthening the main muscle groups involved in gait, particularly the hip flexors, extensors, abductors, and adductors, as well as the quadriceps and hamstrings.

The final stage of the program is functional and task-specific, focusing on gait re-education under progressively challenging conditions. This includes variations in movement planes, obstacle negotiation, unsupported walking, the use of added resistance, and walking on unstable or inclined surfaces. Exercise progression is achieved through increasing motor task complexity, reducing external support, and introducing temporal and biomechanical constraints, with the goal of stimulating neuromotor adaptation, intersegmental coordination, and postural control.

Overall, the program is characterized by a systematic, individualized, and progressive approach that combines principles of neuromotor re-education with functional gait-specific exercises, thereby supporting the optimization of gait parameters and enhancing functional independence in post-stroke patients.

The proposed gait rehabilitation program differs from standardized rehabilitation protocols through its individualized, deficit-oriented approach. While conventional protocols typically rely on fixed exercise sequences and progression criteria applied uniformly across patients, the present program was specifically tailored to each participant based on their functional impairments, particularly gait asymmetry and the presence of foot drop.

Unlike standardized interventions that emphasize general motor recovery, the developed program integrates task-specific and context-dependent gait training, with a focus on improving dorsiflexor activation, dynamic balance, and adaptability to environmental challenges. Exercise selection, intensity, and progression were continuously adjusted according to each participant's performance and response to therapy, allowing for a more targeted and responsive rehabilitation process. Furthermore, the program places greater emphasis on the restoration of a near-physiological gait pattern, rather than solely improving mobility or independence. This includes specific strategies aimed at correcting compensatory mechanisms commonly observed in post-stroke gait. In contrast, standardized approaches often prioritize functional ambulation without systematically addressing underlying biomechanical deficits.

Statistical Analysis

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Statistical analysis was performed using a mixed-design ANOVA (2×2), with group (control vs. experimental) as the between-subject factor and time (pre- vs. post-intervention) as the within-subject factor. Prior to analysis, the assumptions of normality and homogeneity of variance were assessed. Statistical significance was set at $p < .05$, while effect sizes (η^2) and confidence intervals were also calculated to provide a more comprehensive interpretation of the results.

3. Results

In order to test the formulated hypotheses, statistical analysis was performed on the data obtained following the application of the functional test battery. The results are presented comparatively for the two groups, highlighting within-group progression and between-group differences recorded after the 9-week intervention period. Statistical analysis was conducted using a mixed-design ANOVA model (2×2), with the between-subjects factor representing the type of intervention (control group vs. experimental group) and the within-subjects factor representing the evaluation moment (pre- and post-intervention).

Results of gait parameter assessment using the Dynamic Gait Index

The results demonstrated superior functional improvement in the experimental group compared to the control group. At baseline, the control group obtained a mean Dynamic Gait Index score of 11.50, which increased to 18.62 following the intervention, corresponding to a 61.91% improvement.

Despite this progress, the final mean score remained within a range associated with persistent gait impairment and elevated fall risk. In the experimental group, the baseline mean score was 10.95, increasing to 20.70 post-intervention, representing an 89.04% improvement. This result indicates a substantial functional gain, placing participants within a range associated with improved gait performance and reduced fall risk. Overall, the experimental group demonstrated greater improvement than the control group, with a 27.13 percentage point difference between groups. These findings indicate superior functional recovery in the experimental group, as shown in Table 1, which presents baseline and post-intervention Dynamic Gait Index scores and improvement rates for both groups.

Table 1. *Results obtained for the Dynamic Gait Index*

	Results obtained for the Dynamic Gait Index		
	Initial assessment	**Final assessment**	**Progress rate**
Mean of the control group	***11.5***	***18.62***	***61.91%***
Mean of the experimental group	***10.95***	***20.70***	***89.04 %***

As shown in figure 1, both groups demonstrated improvements in Dynamic Gait Index scores from baseline to post-intervention. However, a greater increase was observed in the experimental group. Similarly, figure 2 indicates that the experimental group exhibited a substantially higher percentage improvement in Dynamic Gait Index scores compared with the control group.

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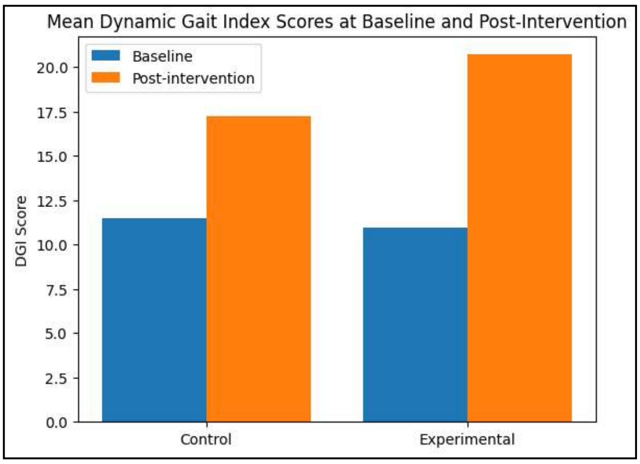

Figure 1. *Mean Dynamic Gait Index scores at baseline and post-intervention for both groups*

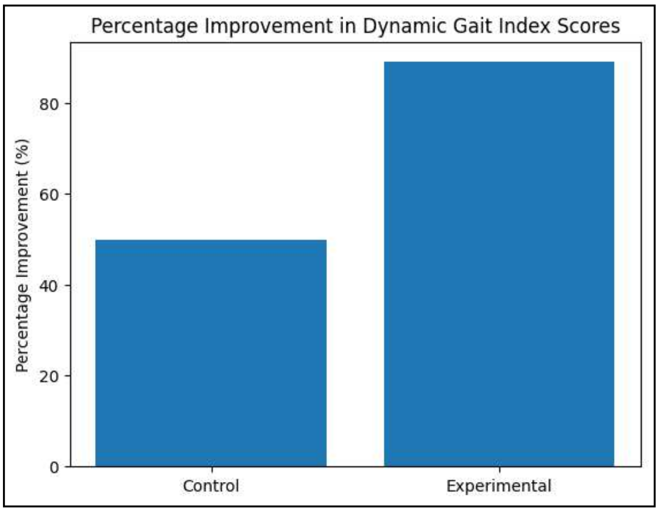

Figure 2*. Percentage improvement in Dynamic Gait Index scores for both groups*

A mixed-design ANOVA (2 × 2) was conducted to examine the effects of TIME (initial vs. final assessment) and GROUP (control vs. experimental) on Dynamic Gait Index scores.

The results indicated a significant main effect of TIME, $F(1, 46) = 1339.58$, $p < .001$, $\eta^2 = .97$, suggesting a substantial overall improvement in Dynamic Gait Index scores from the initial to the final assessment across both groups.

A significant main effect of GROUP was also observed, $F(1, 46) = 51.39$, $p < .001$, $\eta^2 = .10$, indicating differences between the control and experimental groups regardless of measurement time. In addition, the interaction between TIME and GROUP was significant, $F(1, 46) = 51.39$, $p < .001$, $\eta^2 = .10$, showing that the experimental group demonstrated a significantly greater improvement over time compared to the control group. Post-hoc comparisons confirmed that participants in the experimental group achieved higher Dynamic Gait Index scores at the final assessment ($M = 20.70$) compared to the control group ($M = 18.62$), $p < .05$. Overall, the results demonstrate that both groups improved in gait performance following the intervention period; however, the experimental group showed significantly greater gains. These findings suggest that

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the applied intervention was more effective in enhancing dynamic gait parameters and reducing fall risk compared to the standard condition.

As illustrated in **figure 3**, a clear time × group interaction is observed, with both groups improving over time, but with a more pronounced increase in the experimental group compared to the control group.

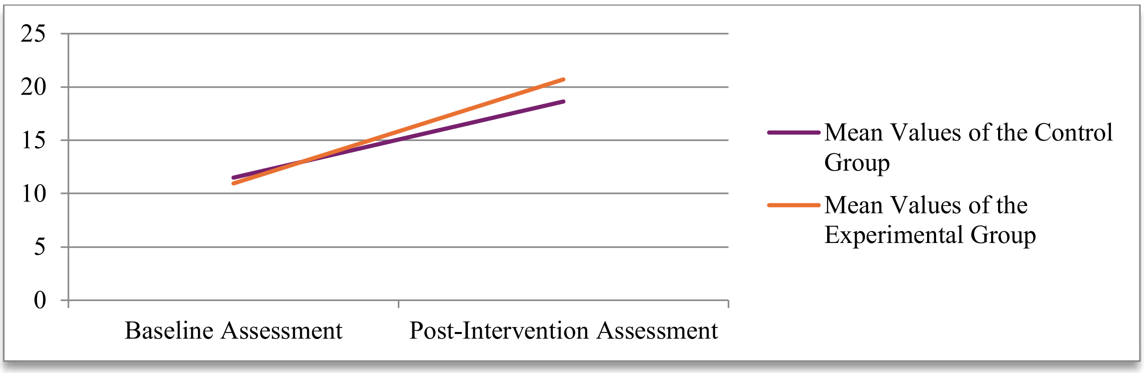

Figure 3. *Interaction effect of time and group on mean Dynamic Gait Index scores.*

Results of gait parameter assessment using the Lower Extremity Functional Scale

Results of gait parameter assessment using the Lower Extremity Functional Scale (LEFS) demonstrated marked functional improvement in both groups. At baseline, the control group recorded a mean score of 18.58 points, corresponding to severe functional limitation, while the experimental group had a comparable baseline value of 17.45 points.

Following intervention, the control group showed an increase to a mean LEFS score of 49.79 points, with improvement reaching 168%, indicating a transition toward mild functional limitation. In contrast, the experimental group demonstrated a greater increase, reaching a post-intervention mean score of 64.95 points, corresponding to a functional gain of 272.2%.

Overall, the experimental group exhibited superior functional recovery compared to the control group, suggesting greater effectiveness of the applied intervention protocol. Detailed results are presented in table 2, which summarizes baseline and post-intervention LEFS mean scores and the calculated percentage improvement for both groups. As shown in figure 4, both groups improved in Lower Extremity Functional Scale (LEFS) scores from baseline to post-intervention, with a greater increase in the experimental group. Figure 5 similarly shows a higher percentage improvement in LEFS scores for the experimental group compared with the control group.

Table.2. *Results obtained from the LEFS scale*

	Results obtained from the LEFS scale		
	Initial assessment	**Final assessment**	**Progress rate**
Mean of the control group	***18.58***	***49.79***	***168.00%***
Mean of the experimental group	***17.45***	***64.95***	***272.20%***

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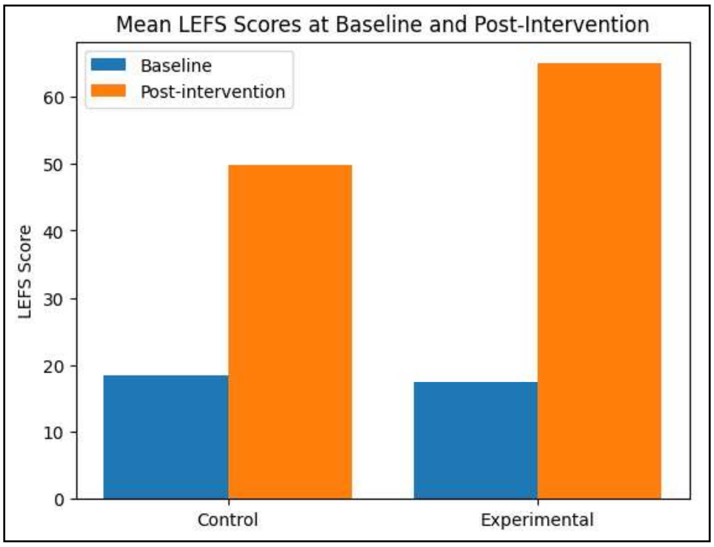

Figure 4. *Mean LEFS Scale scores at baseline and post-intervention for both groups*

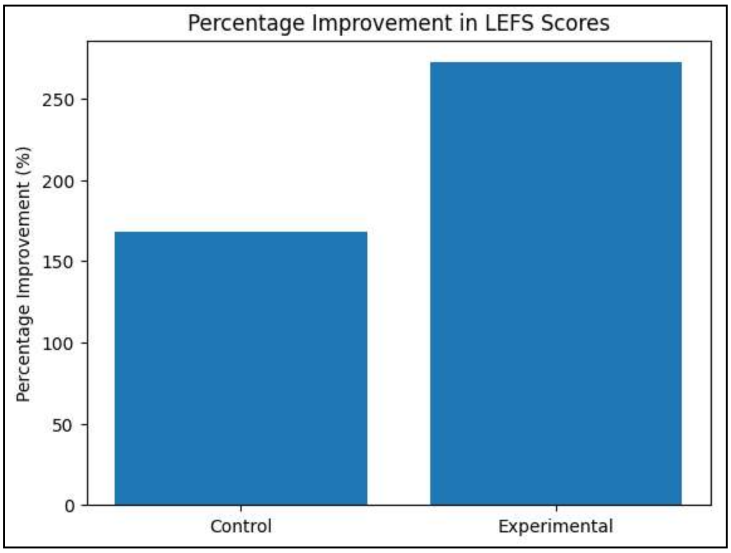

Figure 5. *Percentage improvement in LEFS Scale for both groups*

According to the recorded data, there was a significant main effect of the ***TIME*** variable on LEFS scores, **$F(1, 46) = 1807.46$, $p < .001$, $\eta^2 = .98$**. Additionally, mean LEFS scores were significantly higher at the final assessment (**$M = 57.37$; $SD = 9.66$**) compared to the initial assessment (**$M = 18.02$; $SD = 2.77$**), with **$p < .001$**. There was also a significant main effect of the ***GROUP*** variable (the two treatment categories) on LEFS scores, **$F(1, 46) = 53.31$, $p = .001$, $\eta^2 = .54$**. Participants in the experimental group achieved a higher mean LEFS score (**$M = 41.21$**) compared to the control group (**$M = 34.19$**), **$p = .001$**, as measured using the Lower Extremity Functional Scale (LEFS).

For LEFS functional scores, all statistical test results indicated rejection of the null hypotheses. Therefore, the working hypothesis stating that the application of specific intervention strategies

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leads to significantly greater improvements compared to standard rehabilitation is supported by the presented data.

Figure 6 illustrates the changes in mean LEFS scores from baseline to post-intervention in both groups, showing improvements in both the control and experimental groups, with a greater increase observed in the experimental group.

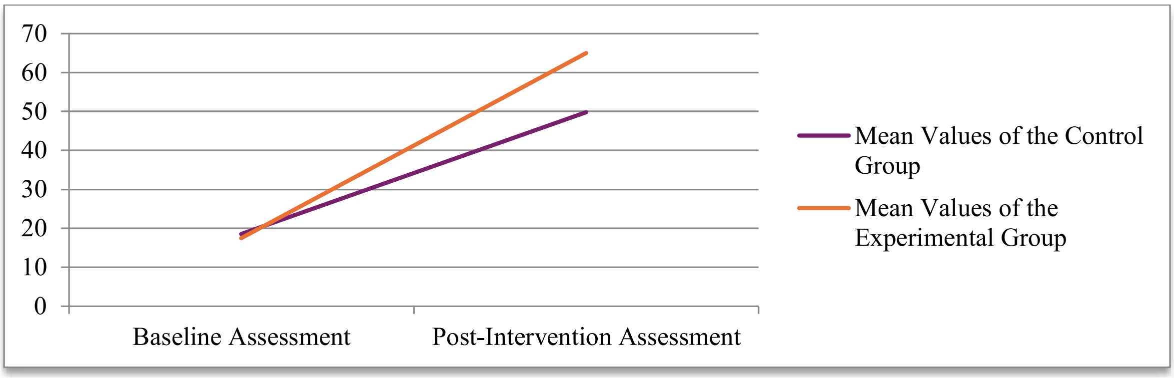

Figure 6. *Interaction effect of time and group on mean* ***Lower Extremity Functional Scale***

4. Discussion

The study hypothesis stated that a monitored physiotherapy program would lead to superior improvements in gait parameters compared to conventional rehabilitation in post-stroke patients. The findings of the present study support this hypothesis, as a significant interaction effect between time and intervention group was observed, indicating greater functional improvement in the experimental group.

Participants who underwent the monitored physiotherapy program demonstrated better outcomes in walking speed, dynamic balance, and lower limb functional performance compared to those receiving conventional rehabilitation. Improvements in the Dynamic Gait Index suggest enhanced postural control and better adaptability during gait, while gains in the Lower Extremity Functional Scale indicate improved functional use of the affected limb.

The rehabilitation protocol also included the use of an ankle–foot orthosis (AFO), aimed at improving ankle stability and facilitating a more efficient gait pattern in participants with foot drop. The observed outcomes therefore reflect the combined effect of orthotic support and task-specific physiotherapy, although the independent contribution of the AFO cannot be determined within this study design.

The improvements observed in the Dynamic Gait Index indicate an increased capacity to adapt to variable environmental conditions and enhanced postural stability during walking. This aspect is particularly important from a clinical perspective, as dynamic balance represents a key determinant in fall prevention among neurological patients. The results suggest that the integration of proprioceptive exercises and progressive functional training contributed to the improvement of postural control.

Furthermore, the results obtained from the Lower Extremity Functional Scale highlight superior recovery of the functional capacity of the affected lower limb within the experimental group. This improvement may be explained by the complex therapeutic approach, which combined neuromotor facilitation, gait phase training, and proximal stability exercises. Improved proximal control biomechanically facilitates distal segment performance, contributing to more efficient gait patterns.

From a clinical perspective, the functional improvements may be associated with task-oriented training and progressive rehabilitation strategies commonly used in neurorehabilitation practice. These approaches support motor relearning and functional recovery following stroke. Methodological limitations, including the relatively small sample size and restricted age range, should be considered when interpreting the results.

5. Conclusions

The monitored and individualized physiotherapy program demonstrated superior effectiveness compared to conventional rehabilitation in improving functional gait outcomes in post-stroke patients.

Participants in the experimental group achieved significantly better results in dynamic balance and lower limb functional capacity, as evidenced by the improvements in the Dynamic Gait Index and the Lower Extremity Functional Scale. These outcomes indicate enhanced postural control, improved functional mobility, and greater independence in lower limb use during gait-related activities.

The findings confirm the study hypothesis, supporting the advantage of a structured, continuously monitored rehabilitation approach in post-stroke functional recovery.

However, the interpretation of these results should take into account methodological limitations, including the relatively small sample size and the specific clinical characteristics of the study population, which may influence the generalizability of the findings. Further research involving larger cohorts, more diverse populations, and long-term follow-up assessments is necessary to validate these results and to better establish the clinical effectiveness of this rehabilitation approach.

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